APPENDIX 8 – 1 ENVIRONMENTAL DISCIPLINE CHANGE ANALYSIS DOCUMENTS

Environmental Discipline Change Analysis

A major focus of the Supplement Analysis is the change analysis for the different environmental disciplines addressed by the 1995 EIS. The change analysis is a disciplined approach to determining what has changed over the last five years in each of the disciplines. These changes were then evaluated to determine whether the environmental disciplines changes have resulted in potential environmental impacts different than previously reported or whether those changes are expected to produce impacts different than previously reported.

The first step in this analysis is a review of the scope of the specific environmental discipline as covered by the 1995 EIS. The second is a review of the specific changes that have taken place in that environmental discipline. Areas of change may have included review methodology, assumptions, analytical methods, data adequacy, accident scenarios, accident probabilities, cumulative impacts, changes in the regulatory environment, and other NEPA analyses that have been completed. The third step is a summary of the major changes and an evaluation of whether additional analysis is required.

Existing analytical data was used where it was available. No new data collection activities were undertaken as a part of this project. The recommendations for additional analysis are based on the professional judgment of the subject matter expert. Each environmental discipline evaluation was subjected to review by the team of subject matter experts, program representatives, NEPA analysts, and project personnel to ensure that each evaluation is thorough and consistent not only between environmental disciplines but also with the program change analysis.

Appendix 8-2 contains the procedure for conducting the environmental discipline evaluations.

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8-1.1 Adverse Environmental Impacts Which Cannot Be Avoided

Scope of 1995 Analysis

The 1995 EIS analyses in section 5.16 accounted for those environmental impacts that potential mitigation measures could not reduce or avoid. The five disciplines that were determined to have unavoidable adverse environmental impacts were: cultural resources, aesthetic and scenic resources, air resources, water resources, and ecology.

Changes in the Environmental Discipline

The methodology used in the 1995 EIS was to review the cumulative impacts and the project specific impacts for potential adverse effects that could not be reduced or avoided by using mitigation measures. This same methodology was used for this SA. The major assumption used was that if the adverse impact could be mitigated then it was determined to not be in this category.

Regulatory changes that have been implemented since 1995 have in general resulted in a reduction in potential adverse impacts. Consequently the amount of adverse effects that cannot be avoided has not increased.

For the five disciplines above that were previously determined to have unavoidable adverse impacts, changes have taken place in the following areas.

Cultural Resources: There have not been any significant changes from the 1995 EIS.

Aesthetic and Scenic Resources: The primary change has been that the New Waste Calcining Facility at INTEC has suspended operations pending the results of the HLW & FD EIS. This has resulted in a positive change to the aesthetic environment.

Air Resource: Most of the air emissions have been less than what was previously analyzed resulting in less adverse impact. For the few pollutants that exceeded the analysis, the impacts have been shown to be minimal.

Water Resources: A great deal of analysis has been completed for the area of ground water contamination. As a result, much more is known concerning the adverse impacts to the environment. Additional analysis is still needed in order to completely understand the impacts from ongoing D&D decisions on ground water contamination.

Ecology: The effects of wildfire on the sage grouse population will be analyzed in the Wildland Fire EA. This analysis is required in order to fully understand these impacts. This analysis will include impacts to the high desert steppe from the 1995 – 2001 wildland fires.

Summary of Major Impacts

Of the projects analyzed in the 1995 EIS, some are no longer operating and of the planned projects some have not occurred. In general, adverse environmental effects that cannot be avoided are less than projected in the1995 EIS. However, additional analysis is still required for

both cultural resources and ecology to understand these impacts through completion of the Wildland Fire EA.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INEEL, or decisions deferred in the ROD, will require additional analysis for this discipline.

8-1.2 Aesthetic and Scenic Resources

Scope of 1995 Analysis

Section 4.5 of Volume 2 Part A of the 1995 EIS describes the visual character of the INEEL in 1995 and the surrounding scenic areas including the Craters of the Moon National Monument and the Black Canyon Wilderness Study Area. Section 5.5 of Volume 2 Part A of the 1995 EIS describes the effects of the alternatives on the visual character of the INEEL and those surrounding scenic areas. Also discussed was the fact that the Middle Butte area located in the southern portion of the INEEL is seen by the Shoshone-Bannock Tribes to be an important Native American resource. Impacts to visual quality due to air pollution are covered under Air Resources. The 1995 EIS analysis used the extent of the modification to an area to determine significant visual resource degradation due to structures. The definition of the degree of acceptable modification considers the nature, density, and extent of sensitive visual resources. The assumption used in the 1995 EIS when evaluating this resource area was that the construction of new facilities and modification of existing infrastructure and decontamination and decommissioning projects that occur within an established area boundary would have low visual impact.

Changes in the Environmental Discipline

1. Methodology-No changes
2. Assumptions-No changes
3. Analytical Methods-N/A
4. Data Adequacy- N/A
5. Accident Scenarios-N/A
6. Accident Probabilities-N/A
7. Cumulative Impacts-N/A
8. Changes in Regulatory Requirements-N/A
9. Other NEPA Analysis for INEEL Operations- Additional NEPA analyses for aesthetic and scenic concerns have been completed in the Advanced Mixed Waste Treatment Project EIS; Treatment and Management of Sodium-Bonded Spent Nuclear Fuel EIS; the Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States, including the Role of the Fast Flux Test Facility; and the High-Level Waste and Facilities Disposition EIS.

A qualitative analysis was performed to determine if there were any changes affecting aesthetic and scenic resources. Changes in the land status around the INEEL and construction and demolition activities since 1995 were reviewed to determine changes to the visual quality of the INEEL. The results are as follows:

On November 9, 2000, President Clinton signed a Presidential Proclamation that expanded the boundaries of Craters of the Moon National Monument. The expansion adds 661,000 acres to the existing 54,000-acre monument. Even though the boundaries of the monument were expanded, the boundaries of the wilderness areas were not. As such, no new air quality restrictions related to visual quality were implemented which would have required a review of the visual impact from INEEL operations.

The Black Canyon Wilderness Study Area located at the northeast boundary of the INEEL has not been designated a wilderness area and is still a "study area." This is no change from the status evaluated in the 1995 EIS.

All construction projects are located in or adjacent to existing area boundaries (except the new INTEC percolation ponds which are west of INTEC) and are similar in size and characteristics to existing structures. In addition, decontamination and decommissioning projects would only reduce visual impacts.

New major construction projects at the INEEL since 1994.

CFA
Transportation Complex
Fire Station
Medical Facility
Office buildings

INTEC
Independent Spent Fuel Storage Installation
INEEL CERCLA Disposal Facility

RWMC
8 Waste Storage Buildings
Transuranic Storage Area Retrieval Enclosure
Operations Control Building
Office buildings
Advanced Mixed Waste Treatment Facility

TRA
Radiological Waste Building
Million gallon firewater tank

TAN
Chlorination Treatment Building

Summary of Major Impacts

A qualitative analysis was performed to determine if there were any changes affecting aesthetic and scenic resources. Changes in the land status around the INEEL and construction and demolition activities since 1995 were reviewed to determine changes to the visual quality of the INEEL. There are no air quality or visibility issues that are changing the charcater of the landscape.

The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline. Additional analysis for this discipline is not required.

References:

President of the United States Proclamation 7373 of November 9, 2000, Boundary Enlargement of the Craters of the Moon National Monument, 65 FR 69221

8-1.3 Air Resources

Scope of 1995 Analysis

The 1995 EIS analyzed two scenarios - baseline and cumulative air quality impacts to (1) the National Ambient Air Quality Standards (NAAQS), (2) Prevention of Significant Deterioration (PSD) increments, (3) visibility impairment, and (4) radiological dose. Section 4.7 describes the baseline air emissions that were analyzed and section 5.7 describes the bounding air emissions from the selection of each of the alternatives.

The baseline case analyzed actual and potential emissions from existing INEEL site facilities and those foreseeable facilities anticipated to be operational before June 1, 1995. The foreseeable facilities included: compacting and sizing operations at WERF, Fuel Cycle Facility (FCF) at ANL-W, and operation of the portable water treatment unit at PBF. Baseline radiological impacts are based on 1991 emission estimates, with the exception of the NWCF, which are based on 1993 emissions and scaled up to reflect maximum operations. Baseline air pollutant impacts are based on 1991 air emissions data for the criteria air pollutants and on 1989 emissions data for the toxic air pollutants.

The cumulative scenario included the baseline case plus emissions from (1) construction and operation of new facilities, (2) demolition activities associated with the decontamination and decommissioning of existing facilities, (3) environmental restoration activities, and (4) mobile sources, such as vehicular traffic and heavy equipment operation within the INEEL.

Changes in the Environmental Discipline

1. Methodology

The methodology remains the same with the Annual Air Emissions Inventory and the NESHAPS Annual Report for Radionuclides as the basis for all emissions.

2. Assumptions

The major assumptions in the air analysis center on the sources that were analyzed in both the baseline and cumulative scenario. Sources such as the NWCF, WERF incinerator, and Coal Fired Steam Generating Facility (CFSGF) were significant baseline sources in 1995 and are currently not operating. Pit 9, the Idaho Waste Processing Facility (today's AMWTF), Fort St. Vrain SNF receipt, and the Waste Immobilization Facility were some of the facilities with significant emissions that are no longer under consideration or have been significantly modified, as in the case of AMWTP.

3. Analytical methods

For non-radiological emissions, the environmental impacts discussed above (PSD, NAAQS, visibility) were determined using ISC-2 and VISCREEN models. While both were accepted regulatory models they are limited to impacts within 50 km of the source(s). Today, ISC-3 and VISCREEN are unacceptable to the National Park Service and regulatory agencies typically will accept - ICS-3 and VISCREEN modeling for impacts within 50 km and CALPUFF for beyond 50 km. CALPUFF is a multipurpose model that considers impacts out several hundred kilometers, including regional haze (visibility with sulfur dioxide) and deposition analyses. CALPUFF was

used for the HLW & FD EIS and the CPP-606 boilers air permit. This model was executed in screening mode with meteorological data recommended by the National Park Service. Radiological dose calculations used GENII. GENII is still an acceptable model for dose calculations.

4. Data Adequacy

The 1995 analysis for radionuclide emissions was based on 1991-93 emission data. The analysis for air pollutant emissions was based on 1991 emission data for the criteria air pollutants and on 1989 data for the toxic air pollutants.

The 1999 National Emissions Standards for Hazardous Air Pollutants (NESHAPS) report shows radionuclide emissions that are within the total emissions bounds of the 1995 EIS. The 1999 Air Emissions Inventory shows air emissions that exceed the emissions described in the 1995 EIS for some of the Toxic Air Pollutants and one of the criteria air pollutants. In some cases, these emissions exceed the sum of the baseline and the Alt. B emissions estimates as shown in tables 8-1.3.1 and 8-1.3.2.

4.1 Background – Tables 5-7.2 and 5-7.3 in the 1995 EIS show the effect of implementing the proposed alternative. The document does not state that these impacts are increases over the baseline impacts. A cursory review shows that the baseline data was not included in the alternative B emissions estimates.

Further research showed that the Technical Resource Document (TRD) for Air Resources, Section 6, states that the alternatives analysis was indeed separate from the baseline but that the baseline impacts were added to determine cumulative impacts. This eliminated the primary concern of whether the health and safety impacts that were described in the document included the baseline plus the alternatives impacts for the analysis that was performed. However, the EIS does not state that this is a cumulative analysis. It is only in the research of the TRD that this information was found. This could lead to decision makers not understanding that the alternatives analysis emissions must be added to the baseline in order to understand the bounding emissions, although the health and safety discussion did address the cumulative health impacts.

The baseline data found in table 4-7.2 in the 1995 EIS gives impacts that were based on 1989 (Toxic Air Pollutants) data and 1991 (Air Pollutants) data. It is apparent from a review of the data in comparison with the 1999 emissions data that either all sources of air emissions are not included in the baseline air emissions data or there has been a significant increase in the estimation of air impacts in recent years. Analysis showed that the biggest contributor not included in the baseline air impacts for toxic air pollutants was the NWCF. The NWCF was not operating in 1989 and so the Toxic Air Pollutants baseline data does not include NWCF emissions. (The second NWCF campaign went from Sept. 1987 – Dec 1988. The third NWCF campaign ran from Dec. 1990 – Nov. 1993.) This means that the Toxic Air Pollutants baseline data was not conservative for nitric acid emissions in the 1995 EIS.

The 1999 Air Emissions Inventory was compared with the Title V Air Permit to ensure that the permitted limits are in accordance with the actual reported air emissions. Sources of the major pollutants were compared between the documents. While the documents did not always report the same quantity of emissions, the differences were explainable. The Title V Air Permit does not report emissions from insignificant sources of pollutants. And in some cases, these are included in the 1999 Air Emissions Inventory.

4.2 Analysis of Air Pollutant Emissions

4.2.1. As shown in table 8-1.3.1 and table 8-1.3.2, the 1995 EIS does not appear to be bounding for chloroform, carbon tetrachloride, beryllium, VOCs, or nitric acid. For the Health and Safety impacts for these pollutants, see the Health and Safety portion of this appendix.

4.2.1.1. Nitric Acid - Even though the 1995 EIS underestimated the amount of nitric acid from INTEC, the amount that was analyzed adequately bounds the NWCF emissions. The health and safety impacts for the alternatives were based on the permitted emissions limits with a maximum concentration of 770 $\mu g/m^3$ at INTEC (table 4.7-3) and a maximum yearly emission of 97,000 kg/year (table 4.7-2). The primary source of nitric acid emissions is the NWCF. The 1995 EIS estimated nitric acid emissions of 1690 kg/year. The 1999 air emissions inventory showed nitric acid emission of 23,587 kg. Of this amount, virtually all of the emissions came from NWCF operations. Less than 0.05 kg came from other sources.

It appears that the NOX terms in the1995 EIS may have included the nitric acid emissions. From a modeling standpoint, the nitric acid is modeled and treated as NOX to determine environmental and health impacts. As a result the modeled impacts are bounding for nitric acid emissions.

Because NWCF operations have been suspended pending further analysis and potential additions to the emissions control system, the nitric acid emissions are no longer present from INEEL operations. Future operation of the NWCF including Maximum Achievable Control Technology (MACT) upgrades is one alternative being evaluated as a part of the HLW & FD EIS.

4.2.1.2. Carbon tetrachloride, Chloroform – Since the 1995 EIS was completed, additional analysis has been done to more completely understand the air emissions from the TRU stacks at RWMC. This additional analysis showed that the 1995 EIS underestimated emissions of carbon tetrachloride and chloroform. The estimates that were used in the 1995 EIS were based on the best available information at the time.

From Sept. 3, 1995 to Sept. 15, 1996, organic air emissions monitoring was conducted in the waste storage modules to determine actual emissions from the stored transuranic waste. This work resulted in a much more thorough understanding of the emissions from the wastes which has been reflected in the Air Emission Inventory (AEI) report. One item that was noted in a review of reference #6 is that temperature fluctuations resulted in a widely varying emissions fluctuation. When the weather is hot, the emissions are as much as an order of magnitude greater than when the weather is cold. The 1999 Air Emissions Inventory is conservative for these two pollutants because the emissions that were used were taken from the hottest (and thus the greatest emissions time) for the year. The report shows that an average emission rate over the course of the year results in projected emissions of 614 kg/year (vs. 2468 kg/year reported in the 1999 AEI) for carbon tetrachloride and 14.88 kg/year (vs. 33.48 kg/year reported in the 1999 AEI) for chloroform. This is less than was reported in the 1999 AEI. However, these emissions are still greater than the emissions analyzed in the 1995 EIS.

To help put these emissions into perspective, the purpose for the monitoring in the waste storage modules was to determine if these sources needed to be included as a separate emissions source in the Title V Air Permit for the INEEL. The definition of a significant source of pollutants from a permitting standpoint is one that emits greater than one ton of pollutants per

stack. The transuranic waste is stored in five different buildings each with it's own stack. As a result, these do not require permitting because they are considered an insignificant source. So while the emissions of these pollutants were greater than was previously analyzed, the State of Idaho does not consider these to be a significant source of pollutants.

4.2.1.3. Beryllium – All of the beryllium emissions on the site are generated as a result of burning fossil fuels (coal, fuel oil, and diesel). As a part of the HLW & FD EIS, a review was done on the emissions from the burning of fossil fuels. This resulted in revised emissions estimates. As a result, the emissions of beryllium were discovered to have been previously underestimated.

4.2.1.4. VOCs – An analysis of the VOCs emitted on the INEEL show that they come from every major facility on the site.

Prior to 1997, only permitted sources of VOCs were reported. In 1997 and subsequent years, efforts were made to try to start to understand the actual emissions from the entire site, including non-permitted sources. These non-permitted sources are small emission generators and are not considered by the state of Idaho to require reporting. In order to fully understand the environmental impacts from INEEL emissions, efforts were made to try to estimate these emissions. Now the Air Emissions Inventory includes small engines (less than 100 hp), grouped sources, specific subcontractor sources that were previously excluded, and other insignificant non-permitted sources. Also, prior to 1999, there was a deminimus level for air emissions in which any source that generated less than five pounds of pollutants was not included. Now all of these sources are included in the Air Emissions Inventory. As a result, the reported air emissions of VOCs have more than doubled. This is not a reflection of additional emissions sources but better accounting of the actual emissions on the site.

4.2.2. Additional Information on the NWCF and VVE Facilities - Recent analytical work in determining actual emissions from INEEL operations has been completed for the New Waste Calcine Facility (NWCF) and the Vapor Vacuum Extraction (VVE) units at RWMC. Both of these facilities have increased emissions over what was previously projected in the 1995 EIS. While the NWCF is currently shut down, the emissions shown in the 1999 Air Emissions Inventory are known to be inaccurate for NWCF emissions. Future operation of the NWCF is contingent upon the decisions from the HLW & FD EIS, which includes the updated air emissions data.

The VVE units at the RWMC have greater emissions than were previously analyzed as shown in reference #5 for some pollutants. While not considered a source that would require permitting (see above discussion) or that would result in significant health impacts, the 1995 EIS does not consider these increased emissions. Typically, air emissions from Environmental Restoration projects are not included in the Air Emissions Inventory nor are they permitted emissions per Idaho state regulations. The increased emissions from the VVE units include chloroform (which is discussed above) and hydrochloric acid, which was not previously considered for the VVE units. Adding the new emissions data for HCl from the VVE units to the 1999 AEI data shows that HCl emissions are greater than was previously analyzed. Table 8-1.3.4 shows the revised emissions data for the VVE units.

4.3 Analysis of Radionuclide Emissions

A comparison of the actual emissions as reported in the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) 1999 annual report with the estimated emissions in

the1995 EIS shows some differences. The 1995 EIS only listed nine specific radionuclides, plutonium and uranium were show as a combination of all of the isotopes of each element, and a value was estimated for all remaining radionuclides. The NESHAPs report has a list of 143 specific radionuclides, plutonium and uranium are also shown as a combination of all isotopes of each element, gross alpha, gross beta/gamma, and gross beta are also shown. The value for "all other isotopes" given in the 1995 EIS is less than the total curies of all other isotopes that is given in the 1999 NESHAPs report. However, given the difference in detail between the two reports, it is understandable that there would be discrepancies. The total curie emissions in the 1995 EIS is still greater than all emissions reported in the 1999 NESHAPs report. To determine whether the radionuclide analysis is outside the bounds established by the 1995 EIS, it is important to look at the projected doses coming from the radionuclides and compare those with the actual dose from 1999 emissions.

For CY 1999, airborne radionuclide emissions from the INEEL operations were calculated to result in a maximum individual dose to a member of the public of 7.92E-03 mrem (7.92E-08 Sievert). The highest dose estimated for the maximally exposed individual in the 1995 EIS is associated with Alternative D. This dose (0.79 mrem per year), when added to the baseline dose of 0.05 mrem per year, results in a total maximum estimated dose to a member of the public of 0.84 mrem. This is well above the actual dose received by a member of the public showing that the 1995 EIS does provide a bounding analysis for radioactive air emissions sources.

5. Accident Scenarios

No Change.

6. Accident Probabilities

No Change.

7. Cumulative Impacts

The air analyses support the Aesthetic and Scenic Resources and Health and Safety disciplines.

8. Changes in Regulatory Requirements

There have been few, if any changes in regulatory requirements with the exception of visibility. Prior visibility analyses were based on impacts within close proximity of a source. Today, regulatory agencies consider visibility on a regional scale. The continued use of CALPUFF in a screening mode with limited meteorological data will likely meet with resistance from the Park Service and regulatory agencies in future NEPA actions and air permitting.

9. Other NEPA Analysis

The HLW & FD EIS is the only NEPA analysis that would provide some coverage for this environmental discipline for the broader regional impact. The HLW & FD EIS tiered off the 1995 EIS with the intent of reducing the amount of new analyses. However, new analyses were conducted with CALPUFF for the two HLW processing options all in a screening mode.

Summary of Major Impacts

The maximum emissions from radiological sources are bounded by the analysis in the 1995 EIS. For air pollutants, the maximum emission scenario for cumulative emissions from baseline and preferred alternative sources remains bounding for most pollutants, as there are fewer sources operating today. There are five pollutants that exceeded the baseline established in the 1995 EIS. A review of the health effects of these pollutants show that they are well below established emissions standards. Because it can be readily shown that there are no adverse health effects associated with these pollutants, additional analysis is not required for these pollutants.

The existing analysis does not show any adverse impacts from air emissions at 50 km. It is not anticipated that there will be any adverse impacts from air emissions at 200 km. However, due to stakeholder concerns, analysis in the HLW & FD EIS has been completed out to 200 km for some sectors. The methodology has changed such that now regional impacts can be considered using new models. Limited use of new models (CALPUFF in a screening mode) in the HLW & FD EIS and the CPP-606 Prevention of Significant Deterioration permit provide some mitigative influence on the changes in the discipline. Additional analyses using the latest emissions data and a full compliment of meteorological data are warranted to address stakeholder concerns and to assist DOE in identifying the need for and location of additional regional monitors.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INEEL, or decisions deferred in the ROD, will require additional analysis for this discipline. Additional analysis is recommended to address stakeholder concerns regarding air quality beyond 50 km.

Table 8-1.3.1 Criteria Air Pollutant Emissions (kg per year)

	1995 EIS Alt. B Estimate	1995 EIS Actuals + Projected Increases	1995 EIS Permitted Maximums	Amount Analyzed[a]	1999 Actual Emissions
Carbon monoxide	102,800	301,300	2,200,000	2,302,800	272,000
Nitrogen dioxide	1,908,704	744,400	3,000,000	4,908,704	526,000
Sulfur dioxide	95,133	202,100	1,700,000	1,795,133	19,200
Particulate matter	75,067	302,400	900,000	975,067	45,400
Volatile organic compounds	14,239			14,239	36,400
Lead	208	11	68	276	2.6
	1995 EIS Table 5-7.2	1995 EIS Table 4-7.2	1995 EIS Table 4-7.2		1999 Air Emissions Report

a – Column 5 is the sum of column 2 and the greater of column 3 or column 4.

Table 8-1.3.2 Toxic Air Pollutant (kg per year)

	1995 EIS Alt. B Estimate	1995 EIS Actuals + Projected Increases	1995 EIS Maximums	Amount Analyzed[a]	1999 Air Emissions Inventory – Actual Emissions	Revised VVE Emissions[b]	Total INEEL Emissions
Acetaldehyde		31	180	180	3.63		3.63
Ammonia	1.6	1600	6500	6501.6			
Arsenic	0.49	4.2	24	24.49	1.72		1.72
Asbestos	0.44			0.44			
Benzene	190	370	530	720	25		25
1,3-Butadiene		220	390	390	0.12		0.12
Beryllium	0.18			0.18	0.59		0.59
Cadmium compounds	1.3			1.3	0.67		0.67
Carbon tetrachloride	240	28	28	268	2,468		2,468
Chlorine (Cl_2)						154	154
Chloroform	9.6	1.95	1.9	11.5	33.48	18.2	51.68
Chromium compounds	6.9	3.12/0.4	38/26	44.9/32.9	1.37		1.37
Cyclopentane		350	350	350			
Dichloromethane		620	1100	1100	1.45		1.45
Formaldehyde	2000	960	3300	5300	54.43		54.43
Hydrazine		8.3	8.3	8.3			
Hydrochloric acid	16,000	1500	1500	17500	6,350	15,600	21,950
Hydrofluoric acid	1100			1100	907.19		907.19
Mercury	440	200	200	640	34.52		34.52
Methylene chloride	2000			2000	24.09		24.09
Napthalene		16	16	16	4.35		4.35
Nickel	43	270	1000	1043	1.22		1.22
Nitric acid	190	1500	97,000	97190	23,587		23,587
Polychlorinated biphenyl	3			3			

Perchloroethylene	12			12	0.73		0.73
Phosphorus		56	210	210			
Propionaldehyde		62	110	110	0.91		0.91
Styrene		4.7	4.7	4.7	0.061		0.061
Sulfuric acid	65			65			
Tetrachloroethylene		980	980	980	4.01E-04		4.01E-04
Toluene		580	580	580	33.97		33.97
1,1,1-Trichloroethane						5.96	5.96
Trichloroethylene	55	4.68	4.5	59.68	15.88		15.88
Trichloro-trifluoroethane	4			4			
Trimethylbenzene		87	87	87			
References	Table 5-7.2	Table 4-7.2	Table 4-7.2		1999 Air Emissions Report	VVE Report	

a – Column 5 is the sum of column 2 and the greater of column 3 or column 4.
b – The data that is included here is the portion of the emissions that are greater than were included in the 1995 EIS.

Table 8-1.3.3 Radiological Air Emissions Sources (curies)

Radionuclide	1995 EIS Estimate	1999 NESHAPS Emissions Report				
		Contin-uously Measured Sources - Table II-8	Point Sources - Table II-9	Non-point sources - Table II-10	Total Emissions	All Isotopes not specified in the 1995 EIS
Ac-227			1.46E-11		1.46E-11	1.46E-11
Ac-228			2.05E-11		2.05E-11	2.05E-11
Ag-108d			1.40E-17		1.40E-17	1.40E-17
Ag-108m				1.60E-07	1.60E-07	1.60E-07
Ag-108md			1.03E-12		1.03E-12	1.03E-12
Ag-110m			0.00E+00	2.40E-07	2.40E-07	2.40E-07
Am-241	2.10E-02	8.22E-09	9.76E-07	2.20E-09	9.87E-07	
Am-243			3.87E-10		3.87E-10	3.87E-10
Ar-41			1.22E+03		1.22E+03	1.22E+03
Ba-139			0.00E+00		0.00E+00	0.00E+00
Ba-140			5.89E-11	5.60E-08	5.61E-08	5.61E-08
Be-7			6.60E-12		6.60E-12	6.60E-12
Bi-207d			1.00E-15		1.00E-15	1.00E-15
Bi-210			7.27E-13		7.27E-13	7.27E-13
Bi-212			1.45E-11		1.45E-11	1.45E-11
Bi-214			1.23E-11		1.23E-11	1.23E-11
Bk-249d			5.00E-12		5.00E-12	5.00E-12
C-14		3.98E-03	6.42E-01	9.70E-02	7.43E-01	7.43E-01
Cd-113md			0.00E+00		0.00E+00	0.00E+00
Ce-141			8.52E-11		8.52E-11	8.52E-11
Ce-144			4.59E-13	9.09E-07	9.09E-07	9.09E-07
Cf-249d			5.23E-12		5.23E-12	5.23E-12
Cm242			2.42E-13		2.42E-13	2.42E-13
Cm-243			0.00E+00		0.00E+00	0.00E+00
Cm-244			2.00E-09		2.00E-09	2.00E-09
Cm-248			2.10E-12		2.10E-12	2.10E-12
Co-57			1.00E-13		1.00E-13	1.00E-13
Co-58			4.49E-11	7.20E-07	7.20E-07	7.20E-07
Co-60	7.30E-02	1.06E-07	1.84E-04	7.76E-04	9.60E-04	
Cr-51			2.47E-03	6.00E-05	2.53E-03	2.53E-03
Cs-134	3.80E-01	2.10E-07	2.05E-05	1.94E-06	2.27E-05	
Cs-137				2.33E-04	2.33E-04	2.33E-04
Cs-137/Ba-137m			8.81E-04		8.81E-04	8.81E-04
Cs-138			2.10E-02		2.10E-02	2.10E-02
Eu-152			3.76E-06	2.81E-05	3.19E-05	3.19E-05
Eu-154			1.99E-06	3.51E-05	3.71E-05	3.71E-05
Eu-155			1.74E-07	1.50E-05	1.52E-05	1.52E-05
Fe-55			7.78E-05		7.78E-05	7.78E-05
Fe-59			3.15E-09		3.15E-09	3.15E-09

Radionuclide	1995 EIS Estimate	1999 NESHAPS Emissions Report				
		Contin-uously Measured Sources - Table II-8	Point Sources - Table II-9	Non-point sources - Table II-10	Total Emissions	All Isotopes not specified in the 1995 EIS
Gd-153d			0.00E+00		0.00E+00	0.00E+00
Gross Alpha			6.17E-06		6.17E-06	6.17E-06
Gross Beta/Gamma			1.22E-04		1.22E-04	1.22E-04
Gross Beta			0.00E+00		0.00E+00	0.00E+00
H-3	4.10E+03	7.53E+01	1.70E+02	1.46E+02	3.91E+02	
Hf-175			7.00E-05	7.40E-07	7.07E-05	7.07E-05
Hf-181			6.54E-07	1.00E-05	1.07E-05	1.07E-05
Hg-203			2.31E-05		2.31E-05	2.31E-05
I-125			3.27E-10		3.27E-10	3.27E-10
I-128d			0.00E+00		0.00E+00	0.00E+00
I-129	1.90E-01	2.61E-03	1.60E-07	3.80E-08	2.61E-03	
I-131			8.93E-04	1.20E-03	2.09E-03	2.09E-03
I-132			1.47E-03		1.47E-03	1.47E-03
I-133			2.91E-03	2.00E-05	2.93E-03	2.93E-03
I-134			2.22E-03		2.22E-03	2.22E-03
I-135			1.24E-01		1.24E-01	1.24E-01
Ir-192			7.29E-07		7.29E-07	7.29E-07
Ir-194			1.75E-07		1.75E-07	1.75E-07
K-40			3.96E-11		3.96E-11	3.96E-11
Kr-85	2.10E+04	1.96E+03	4.70E-02		1.96E+03	
Kr-85m			0.00E+00		0.00E+00	0.00E+00
Kr-88			0.00E+00		0.00E+00	0.00E+00
La-140			3.17E-06	3.30E-08	3.20E-06	3.20E-06
Mn-54			2.12E-06	1.30E-06	3.42E-06	3.42E-06
Mn-56			0.00E+00		0.00E+00	0.00E+00
Mo-99			9.49E-15	1.20E-07	1.20E-07	1.20E-07
Na-22			5.20E-13		5.20E-13	5.20E-13
Na-24			5.49E-04	1.70E-05	5.66E-04	5.66E-04
Nb-94			3.00E-10		3.00E-10	3.00E-10
Nb-95			1.43E-11	3.41E-07	3.41E-07	3.41E-07
Ni-59			9.15E-12		9.15E-12	9.15E-12
Ni-63			5.36E-06		5.36E-06	5.36E-06
Np-237			3.96E-11	1.60E-08	1.60E-08	1.60E-08
Np-239			7.07E-06	6.90E-08	7.14E-06	7.14E-06
Os-191			1.74E-07		1.74E-07	1.74E-07
P-32			0.00E+00		0.00E+00	0.00E+00
Pa-231			4.61E-11		4.61E-11	4.61E-11
Pa-233			3.92E-11		3.92E-11	3.92E-11
Pa-234/Pa-234m			2.70E-07		2.70E-07	2.70E-07
Pb-210			7.33E-13		7.33E-13	7.33E-13

Radionuclide	1995 EIS Estimate	1999 NESHAPS Emissions Report				
		Contin-uously Measured Sources - Table II-8	Point Sources - Table II-9	Non-point sources - Table II-10	Total Emissions	All Isotopes not specified in the 1995 EIS
Pb-212			4.06E-11		4.06E-11	4.06E-11
Pb-214			1.29E-11		1.29E-11	1.29E-11
Plutonium Isotopes	5.80E-02	2.38E-06		1.70E-08	2.40E-06	
Pm-147			3.03E-09		3.03E-09	3.03E-09
Po-210			5.33E-13		5.33E-13	5.33E-13
Po-214			1.23E-11		1.23E-11	1.23E-11
Po-216			7.59E-13		7.59E-13	7.59E-13
Po-218			1.22E-11		1.22E-11	1.22E-11
Pr-144			1.83E-13		1.83E-13	1.83E-13
Pu-236			1.68E-10		1.68E-10	1.68E-10
Pu-238			2.22E-07	1.52E-08	2.37E-07	2.37E-07
Pu-239			2.34E-06		2.34E-06	2.34E-06
Pu-239/40				4.19E-09	4.19E-09	4.19E-09
Pu-240			2.80E-08	1.90E-09	2.99E-08	2.99E-08
Pu-241			5.17E-10		5.17E-10	5.17E-10
Pu-242			4.50E-07		4.50E-07	4.50E-07
Ra-226			1.26E-11		1.26E-11	1.26E-11
Rb-88			4.21E-01		4.21E-01	4.21E-01
Re-186d			7.34E-10		7.34E-10	7.34E-10
Re-188				5.10E-09	5.10E-09	5.10E-09
Re-188d			3.06E-04		3.06E-04	3.06E-04
Rh-106				7.20E-08	7.20E-08	7.20E-08
Rn-219			1.46E-11		1.46E-11	1.46E-11
Ru-103			2.23E-12	5.90E-08	5.90E-08	5.90E-08
Ru-106				7.20E-08	7.20E-08	7.20E-08
Ru-106/Rh-106			5.75E-14		5.75E-14	5.75E-14
Sb-122				3.80E-07	3.80E-07	3.80E-07
Sb-122d			2.68E-06		2.68E-06	2.68E-06
Sb-124			1.79E-12	3.60E-06	3.60E-06	3.60E-06
Sb-125				2.71E-07	2.71E-07	2.71E-07
Sb-125/Te-125m	2.90E-02	4.90E-06	7.21E-05		7.70E-05	
Sb-127				1.50E-08	1.50E-08	1.50E-08
Sc-46				5.40E-08	5.40E-08	5.40E-08
Sm-151			1.69E-14		1.69E-14	1.69E-14
Sm-153			1.78E-08		1.78E-08	1.78E-08
Sn-113			1.75E-13		1.75E-13	1.75E-13
Sr-85d			3.13E-08		3.13E-08	3.13E-08
Sr-89			2.28E-07	3.00E-06	3.23E-06	3.23E-06
Sr-90				8.34E-06	8.34E-06	8.34E-06

Radionuclide	1995 EIS Estimate	1999 NESHAPS Emissions Report				
		Continuously Measured Sources - Table II-8	Point Sources - Table II-9	Non-point sources - Table II-10	Total Emissions	All Isotopes not specified in the 1995 EIS
Sr-90/Y-90	4.20E-01	1.20E-04	5.99E-04		7.19E-04	
Ta-182				4.70E-07	4.70E-07	4.70E-07
Tc-99			3.79E-12		3.79E-12	3.79E-12
Tc-99m			1.12E-03		1.12E-03	1.12E-03
Te-132				7.70E-09	7.70E-09	7.70E-09
Th-229			0.00E+00		0.00E+00	0.00E+00
Th-230			5.57E-10		5.57E-10	5.57E-10
Th-231			2.91E-11		2.91E-11	2.91E-11
Th-232			4.27E-11		4.27E-11	4.27E-11
Th-234			2.70E-07		2.70E-07	2.70E-07
ThTL-232				5.10E-09	5.10E-09	5.10E-09
U-232			3.13E-05		3.13E-05	3.13E-05
U-233			2.01E-09		2.01E-09	2.01E-09
U-234			3.47E-08	8.50E-08	1.20E-07	1.20E-07
U-235			1.33E-10	1.32E-07	1.33E-07	1.33E-07
U-236			4.74E-13		4.74E-13	4.74E-13
U-238			2.71E-07	5.61E-08	3.27E-07	3.27E-07
Uranium Isotopes	3.10E-03	1.09E-09		2.40E-08	2.51E-08	
W-187			1.35E-05		1.35E-05	1.35E-05
Xe-131m	1.80E+02	8.82E-14			8.82E-14	
Xe-133			1.05E+01	5.00E-05	1.05E+01	1.05E+01
Xe-135			1.56E+01		1.56E+01	1.56E+01
Xe-135m			0.00E+00		0.00E+00	0.00E+00
Xe-138			0.00E+00		0.00E+00	0.00E+00
Y-90				7.00E-07	7.00E-07	7.00E-07
Y-90m			0.00E+00		0.00E+00	0.00E+00
Y-91m			0.00E+00		0.00E+00	0.00E+00
Zn-65			2.11E-08	5.20E-06	5.22E-06	5.22E-06
Zr-95			3.65E-11	1.70E-06	1.70E-06	1.70E-06
Totals	2.53E+04	2.04E+03	1.42E+03	1.46E+02	3.60E+03	
All other Isotopes	6.20E-01	3.36E+00				1.25E+03

Table 8-1.3.4 Revised Vapor Vacuum Extraction Unit Emissions Data

Pollutant	1995 EIS Emissions Estimate (kg/year)	Revised Emissions Estimate (kg/year)
Carbon Tetrachloride	230	118
Chloroform	7.6	25.8
Perchloroethylene	8.8	3.77
Trichloroethylene	40	24.9
1,1,1-trichloroethane		5.96
HCl		15,600
Cl_2		154

References:

1. 1999 INEEL National Emission Standards for Hazardous Air Pollutants- Radionuclides, Annual Report, June 2000, DOE/ID-10342 (99)

2. Technical Resource Document for Air Resources Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs, DOE/ID-10497, March 1995

3. E-mail note from Steven Zohner, WERF, NWCF, and Coal-Fired Plant emissions from 1999 Air Emissions Inventory

4. Air Emissions Inventory for the Idaho National Engineering and Environmental Laboratory – 1999 Emission Report, DOE/ID-10788, May 2000

5. Operable Unit 7-08 Air Dispersion Modeling and Health Effects from Thermal and Catalytic Oxidation Unit Emissions at the Radioactive Waste Management Complex, EDF-1901, June 25, 2001

6. Routine Organic Air Emissions at the Radioactive Waste Management Complex Waste Storage Facilities Fiscal Year 1996 Report INEL/96-0377, January 1997, K. J. Galloway, J. G. Jolley.

8-1.4 Cultural Resources

Scope of the 1995 Analysis:

The cultural resources of the INEEL are described in Section 4.4 of the Affected Environment Chapter of the 1995 EIS. Section 4.4 is divided into descriptions of prehistoric and historic cultural resources on the INEEL. The impacts to cultural resources of the INEEL from implementing spent nuclear fuel management and environmental restoration and waste management alternatives are analyzed in Section 5.4 of the Environmental Consequences Chapter of the EIS.

Changes in the Environmental Discipline:

1. Methodology.

No change. The methodology for identifying, evaluating, and mitigating impacts to cultural resources has been established through the National Historic Preservation Act (NHPA), the Historic Sites Act, the Archaeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), and the American Indian Religious Freedom Act (AIRFA). These laws and their implementing regulations are still in effect and remain unchanged, with the exception of 36 CFR Part 800, Protection of Historic Properties (new final rule effective January 11, 2001), which implement the NHPA. Both direct and indirect impacts to INEEL cultural resources due to the proposed actions listed in the 1995 EIS are anticipated to remain unchanged, provided that there is no additional construction or demolition of buildings or any additional ground disturbing activities that effect previously undisturbed ground. The program addresses cultural resources in a broader sense of the term to include cultural values and perspectives. Any change to the scope of the 1995 SNF EIS would require additional analysis to determine direct and indirect effects to cultural resources on the INEEL. Cultural resources analysis is routinely completed for every action that may affect cultural resources on the INEEL.

2. Assumptions.

Any archaeological surveys that were performed more than ten years ago will be re-evaluated by the contractor's Cultural Resources Management Office for adequacy. In addition, the entire PBF and ARA areas (WAG-5) are sensitive areas to the Shoshone-Bannock Tribes because of unanticipated discoveries of early Native American remains that were discovered since the preparation of the 1995 EIS. There is a strong likelihood that any ground disturbing activities in these areas could produce inadvertent discoveries of human remains. Inadvertent discoveries are subject to INEEL stop-work authority and have the potential to trigger requirements under the Native American Graves Protection and Repatriation Act (NAGPRA). The National Park Service has informally requested that DOE-ID nominate the entire INEEL as a Historic District for inclusion in the National Register of Historic Places. If that were to happen, the decision would need to be reviewed for any impacts on the 1995 EIS.

3 Analytical Methods. No change.

4. Data Adequacy.

A.) In September 1997, The Arrowrock Group Inc. of Boise, ID prepared "The INEEL - A Historic Context and Assessment Narrative and Inventory." The document was revised in July 1998. This document provides an assessment of 516 buildings on the INEEL. According to the document, 217 of the 516 buildings surveyed are potentially eligible for inclusion in the National Register of Historic Places. This document has a direct bearing on the data in Table 5.4-1 on page 5.4-3 of Vol. 2. For instance, the buildings listed under Decontamination and Decommissioning Projects (TRA-654, TRA-603, CPP-601, CPP-603, CPP-640 and CPP-633) are either individually eligible for the National Register or are contributing properties to the National Register.

B.) The 1992 Working Agreement between DOE-ID and the Shoshone-Bannock Tribes (page 4.4.2 of Vol. 2) was replaced in 1998 and again in 2000 with an Agreement -in-Principle between DOE-ID and the Shoshone-Bannock Tribes.

C.) The INEEL Cultural Resource Management Plan (CRMP) is in final draft and will be completed in 2001 (page 4.4.3 of Vol. 2). This is also true for the Programmatic Agreement between DOE-ID the Idaho State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), which is Appendix F of the CRMP.

5. Accident Scenarios. N/A

6. Accident Probabilities. N/A.

7. Cumulative Impacts. No change.

8. Changes in Regulatory.

The 1992 amendments to the National Historic Preservation Act (NHPA) were promulgated in May 1999, 36 CFR Part 800, Protection of Historic Properties. The new regulations removed much of the responsibility of the Advisory Council on Historic Preservation (ACHP) in the NHPA Section 106 process and placed more responsibility and involvement with the State Historic Preservation Officers. It also gave Native American Tribes more of a role in the overall Section 106 process.

9. Other NEPA Analysis for INEEL operations.

See Cultural Resources sections (4.4 and 5.4) of the Idaho High-Level Waste and Facilities Disposition EIS, December 1999.

Summary of Major Impacts:

Impacts to cultural resources resulting from actions analyzed in the 1995 EIS have been less than expected because there have been fewer acres of land disturbed. However, the 1995 EIS did not anticipate or address the effects of wildfires on cultural resources. Impacts related to wildfires are addressed in the Idaho HLW & FD EIS and are being addressed in more detail in the Wildland Fire Environmental Assessment.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INEEL, or decisions deferred in the ROD, will require additional analysis for this discipline. The Wildland Fire EA being prepared will address

the outstanding cultural impacts. No analysis beyond that being performed by the Wildland Fire EA is required.

References:

1. Arrowrock Group, "The Idaho National Environmental and Engineering Laboratory A Historical Context and Assessment Narrative and Inventory", INEEL/EXT-97-01021, rev. 3, July 31, 1998

2. Miller, Susanne J., "Idaho National Engineering Laboratory Management Plan for Cultural Resources (Final Draft), DOE/ID-10361, Rev. 1, July 1995

3. Agreement -in-Principle between the Shoshone-Bannock Tribes and the United States Department of Energy, dated 9/27/00

8-1.5 Cumulative Impacts and Impacts from Connected or Similar Actions

Scope of 1995 Analysis

"Cumulative Impacts and Impacts from Connected or Similar Actions" relating to the INEEL and surrounding region are analyzed in Volume 2, Part A, Section 5.15 of the 1995 EIS. The Cumulative impacts analyses address Land Use, Socioeconomics, Cultural Resources, Air Resources, Water Resources, Ecological Resources, Transportation, Health and Safety, and Waste Management.

Changes in the Environmental Discipline

1. Methodology

The methodology used to analyze cumulative impacts in the 1995 EIS was to summarize the impacts identified in the separate sections of the Environmental Consequences Chapter (Chapter 5). For example the cumulative impacts analysis repeats the impacts identified in Chapter 5 for Air Resources and Health and Safety. The Health and Safety section of the Cumulative Impacts analysis combines the radiological and non-radiological effects from the atmospheric, groundwater, and biotic pathways. Impacts to both workers and the public were identified. The analysis also compares the sources of radioactive airborne materials on the INEEL with other regional sources, such as phosphate processing operations in Pocatello. Transportation impacts from direct exposure (from the transport of radioactive materials) and traffic accidents were also analyzed.

The 1995 EIS cumulative impact analysis is based on a projection of radiologic and chemical exposures resulting from the alternatives compared to the no action baseline. Each of the alternatives is composed of a set of actions that are the sources of the impacts and risks.

The assessment of whether the 1995 analysis remains adequate is based on a comparison with program reviews and analyses prepared for each of the disciplines analyzed for the Supplement Analysis. The adequacy assessment is also based on a comparison with the cumulative impacts analysis in the 1999 Idaho HLW EIS. The cumulative impacts analysis in the Idaho HLW EIS incorporates the "I Think" computer model to integrate impacts from various sources to identify potential synergistic or additive incremental effects under several "what if" alternative scenarios.

<u>Consideration of direct, indirect, interconnected and synergistic effects in the SA Cumulative Impacts review</u>

Air emissions may be inhaled over time by an individual or a population and have a cumulative impact on health. Air emissions may also result in the deposition of chemicals or radioactive contaminants in soil and water. Soil contaminants may be re-suspended by wind erosion, inhaled and re-distributed repeatedly. These contaminants may in-turn be picked up by vegetation and ingested by herbivores and concentrated up the food chain. Soil contaminants may also be picked up by water run-off or driven through the soil into the groundwater. Humans and animals may be affected by inhaling, ingesting or absorbing contaminants originating from emissions to the air pathway.

Leaks, spills and the disposal of chemical and radioactive contaminants from different locations can have a cumulative impact on water resources. Contaminants may converge from several sources to concentrate contaminates or be diluted and dispersed by the groundwater depending on local and regional hydrology. Contaminated groundwater may be withdrawn and used in many ways by individuals and populations. Use of contaminated groundwater for drinking, cooking, bathing, irrigation and watering livestock can result in cumulative impacts to health.

Contaminated soil or groundwater can affect land use and local economic conditions. As ground water emerges in springs and flows into rivers it may impact the ecology and cultural resource values.

Transportation of radioactive waste or material past an individual or population residing at a stationary location results in a certain exposure risk. Exposure to radioactivity and the corresponding health risks increase as the level of radioactivity or the number of shipments increase. The likelihood of traffic accidents increases with the number of shipments. Thus, transportation may contribute cumulatively to increasing risks to health and safety.

2. Assumptions

Assumptions used for the 1995 EIS cumulative impact analysis are not stated but the basis used for the analysis provides a clear means of comparison with current conditions.

3. Analytical Methods

The 1995 EIS cumulative impacts analysis was based on: a) on historical data; b) alternatives analyzed in the EIS; c) reasonably foreseeable actions; and d), actions that may be unrelated to federal actions or alternatives analyzed in the EIS but may contribute to cumulative environmental impacts.

The first part of the approach used in conducting the cumulative impacts review for the SA was to compare the actions selected for implementation in the 1995 EIS ROD with those actions that have actually been implemented or are still planned. Program reviews were used as the basis for this comparison. The second part was to compare the analysis of each discipline in the 1995 EIS with reviews of each discipline prepared for the SA. These were then compared to the cumulative impacts analyses in the Idaho HLW & FD EIS which contains the most recent comprehensive cumulative impacts analysis of the INEEL.

4. Data Adequacy

In general, data used in the 1995 EIS is adequate and presents a reasonable picture of cumulative environmental impacts of the INEEL and surrounding region. In general, impacts were overestimated because some facilities have been closed, some operations have been discontinued, and some anticipated actions have not been implemented.

Areas where data used in the 1995 EIS may have been incomplete or out of scope and were not used to analyze cumulative impacts are groundwater, flooding, reactor operations, and effects of wildland fires.

For the SA, data available for analyses of cumulative impacts to groundwater and of the cumulative impacts of flooding to facilities and operations remain incomplete for further decision-making. Data is adequate for all other comparisons.

5. Accident Scenarios

Accident impacts are not included in the cumulative impacts section because any impacts from a single accident on a co-located facility are already included in the existing accident analysis.

6. Accident Probabilities

Accident probabilities are not included in the cumulative impacts section because two separate accidents would have to take place at the same time. This scenario is beyond the range of probability considered in the 1995 EIS.

7. Cumulative and synergistic effects

Since the 1995 EIS was issued there have been no facilities constructed, operations initiated, or any unforeseen events that would tend to contribute any incremental increase to cumulative impacts over those analyzed or projected in the 1995 EIS. Overall, the potential for cumulative environmental impacts has been reduced on the INEEL and in the surrounding area. Some of the INEEL's major sources of air emissions have been shut down and some that were planned were not under construction as of October 2000 and are not likely to become operational before 2005. For example, the New Waste Calcine Facility, WERF, EBR-II and ICPP Coal Fired Steam Plant have been shut down; an incinerator is currently not planned as part of the AMWTP, and there are no current plans for thermal treatment associated with Pit 9 retrieval. These examples contributed incrementally to health impacts through the air pathway in the 1995 EIS cumulative impacts analysis. There are other examples such as acreage disturbed that will be less than expected with fewer corresponding impacts to biological and cultural resources, and there will be fewer spent nuclear shipments to the INEEL which reduces transportation associated risk. No impacts have been identified that would synergistically work together or combine to result in greater impacts in extent or intensity than those analyzed in the 1995 EIS.

8. Changes in Regulatory Requirements

There have been no changes in regulatory requirements that would affect the cumulative impact analyses in the 1995 EIS. However, the implementation of those requirements, such as permitting under the Clean Air Act, may have the effect of reducing emissions through requiring more stringent control technology. New required air modeling, such as CALPUF, provides additional data for more distant places but tends to corroborate existing data. DOE Order 435.1 requires the preparation of a "composite analysis" which is a comprehensive review of contaminant sources at a site. Completion of a composite analyses for INTEC and RWMC, combined into a final composite analysis for the INEEL will provide a much better basis for analyzing environmental impacts to groundwater and impacts of residual contaminants to land and biological resources than available during preparation of the 1995 EIS.

9. Other NEPA Analyses for INEEL Operations

Several EAs and EISs have been prepared that tier from the 1995 EIS which analyze existing or proposed INEEL facilities and operations. These are the Advanced Mixed Waste Treatment Project EIS, EIS for the Treatment and Management of Sodium-Bonded Spent Nuclear Fuel, Nuclear Infrastructure EIS, and Idaho High Level Waste and Facilities Disposition EIS. The Idaho HLW EIS also integrates the analysis of CERCLA and RCRA actions to comprehensively analyze impacts or environmental restoration and waste management. Each of these EISs

analyzes the impacts of the actions within their scope as they contribute incrementally to INEEL cumulative environmental impacts. Except for reactor operations, all actions analyzed in these EISs were anticipated and addressed in the cumulative impacts section of the 1995 EIS.

Summary of Major Impacts

The 1995 EIS based its analysis on predictions, whereas the SA bases its comparison on a set of conditions, which for the most part are known. For example, a certain set of facilities have been built, or shut down, resulting in a known set of environmental impacts. In other cases, emissions and contaminants have been measured or are better known and can be compared with the 1995 analysis. Following the outline of the 1995 EIS cumulative impacts analysis the findings are as follows:

Land Use: Impacts to land use have been slightly greater than expected. The 1995 EIS anticipated about 537 acres of undisturbed land would be cleared or excavated for a range of proposed activities. About 705 acres have been cleared or will be before 2005 based recent decision documents.

Socioeconomics: The employment level projected in the 1995 EIS for 2000 was 8,316, while the actual employment for 2000 was 8,130. Socioeconomic impacts from INEEL employment are in line with the EIS analysis.

Cultural Resources: Impacts to cultural resources and historic properties resulting from actions analyzed in the 1995 EIS have been as about as expected. Slightly more acreage has been or will shortly be disturbed and but fewer historic structures effected. The 1995 EIS did not anticipate or address the effects of wildland fires or the impacts of fire fighting such as the un-surveyed grading of emergency firebreaks. Impacts related to wildfire are addressed in the Idaho HLW EIS and will be addressed in detail in the planned Wildland Fire EA. Soil erosion resulting from the fires may have exposed some cultural resource sites to weathering and erosion.

Air Resources: Primary INEEL emissions sources, WERF and NWCF, have been shut down, or placed in standby pending upcoming decisions on whether to install major new emission control systems. Transportation has been less than expected and some INEEL vehicles have been converted to natural gas so transportation related emissions have been less than expected. Air emissions are the most direct pathway to workers and the public and all INEEL air pollutants are emitted into a common airshed so the impacts to receptors within the airshed are cumulative. Because the most significant emissions sources analyzed in the 1995 EIS are no longer in operation, cumulative impacts overall and associated air pathway risks are less than anticipated in the 1995 EIS.

Water Resources: When the 1995 EIS was completed there was insufficient data to analyze cumulative impacts to groundwater from all contaminant sources across the INEEL. Even today, groundwater sampling and modeling have not been fully undertaken site-wide. Since the 1995 EIS was issued, some groundwater samples taken at the RWMC indicate possible but unconfirmed plutonium and americium contamination, presumably from buried waste. Some organic contaminants at CERCLA sites have been removed from ground water by bio and vapor extraction methods.

Cumulative risks associated with flooding or overland flow across the INEEL are imprecisely known. Several flood studies have been conducted though no floodplain elevation has been

determined conclusive by the INEEL Natural Phenomena Committee. This situation is discussed further in the HLW & FD EIS.

Ecological Resources: Impacts to the ecology of the INEEL are primarily tied to acres of surface disturbance. Since the 1995 EIS, fewer acres have been cleared of native vegetation or converted to facility use than expected. Consequently, impacts resulting from the loss of habitat due to facility construction have been less than expected. Wildfires are anticipated naturally occurring events, however their biological effects on the INEEL have not been addressed in a NEPA document. All of the large wildfires on the INEEL have occurred since the 1995 EIS. The effects of these fires, such as the potential conversion of sagebrush steppe to annual grassland, grading firebreaks, soil loss, weed invasion, and the combined effects on site ecology have not been analyzed. Since the 1995 EIS, soils have been analyzed to detect radionuclides, heavy metals and chemical contaminants. The Idaho HLW EIS states both radioactive and chemical contaminants in INEEL soil samples are lower than screening levels.

Transportation: To date, there have been fewer shipments, of GTCC and TRU-waste than forecast in the 1995 EIS, and the associated risks have thus far been correspondingly lower. The number of shipments analyzed in the 1995 EIS may yet occur but will be compressed into a shorter period of time.

Health and Safety: The air and groundwater pathways are the primary sources of potential health effects for workers and the public from past, ongoing and future INEEL operations. The most significant air emissions sources analyzed in the 1995 EIS have been shut down or placed in stand-by so the potential for health effects from INEEL sources has been much reduced. Since the 1995 EIS there have been groundwater and site drinking water samples indicating contaminants different from or slightly exceeding those analyzed in the 1995 EIS but they remain below MCLs for drinking water and are not expected to have any effects on health. Though the 1995 EIS did not analyze reactor or hot cell operations on the INEEL, all waste streams including all discharges and emissions were included in the analysis (i.e. health and safety concerns from these sources were addressed). The Nuclear Infrastructure EIS indicates impacts to health and safety impacts from reactor operations are acceptable. As confirmed by subsequent NEPA documentation, there have been no actions implemented or conditions found to exist on the INEEL since the 1995 EIS was issued that would increase risks to health or safety from chemical or radioactive exposure. Since 1995 two industrial fatalities have occurred within the INEEL workforce (1996 and 1998) causing the fatality rate to increase slightly above that forecast in the 1995 EIS.

Waste Management: Since the 1995 EIS was issued, an additional 586,000 gallons of liquid managed as HLW at the INTEC Tank Farm has been converted to calcine. All backlogged LLW staged for treatment at WERF has been incinerated and the ash disposed. Approximately 295 of 65,000 cubic meters of stored TRU waste have been shipped to WIPP and 2,533 cubic yards of radioactively contaminated soil has been shipped off the INEEL for disposal. There have been no wastes shipped to the INEEL for disposal (some incidental wastes have been disposed) since the 1995 EIS was issued. Through treatment and off site disposal there has been a net reduction in risks associated with the waste forms and volumes existing on the INEEL when the 1995 EIS was issued.

Environmental Restoration: The environmental restoration program has not generated any waste for treatment or disposal not covered under the 1995 EIS and has not reduced or removed any major radioactive risks from the INEEL. Remediation of organic contaminant plumes by bio and vapor extraction methods has been more successful than expected.

Spent Nuclear Fuel: Most INEEL SNF has been removed from underwater storage in basins and placed in dry storage at INTEC as analyzed in the 1995 EIS. Though no SNF has been removed from the INEEL, consolidated dry storage reduces the risks associated with the potential loss of water shielding and leaking storage basins. The 1995 EIS does not analyze the storage of SNF beyond 2035.

Infrastructure: There has been a slight decrease in electrical and heating fuel demand. The Coal Fired Steam Generating Facility has been shut down and replaced entirely with oil boilers. The NWCF has been placed in standby and may not operate in the future which would eliminate the need for kerosene. There have been no facilities constructed, except small support structures, not identified and analyzed in the 1995 EIS. The work force population is very close to that analyzed in the 1995 EIS so requirements for supporting water supply and sanitary facilities have not changed from that analyzed in the 1995 EIS.

Conclusion: There has been a net reduction in risk potential and contributing additive sources and therefore a reduction in cumulative environmental impact risks from INEEL operations since the 1995 EIS was issued. The 1995 EIS adequately discloses and bounds operational cumulative impacts from all sources except for cumulative risk from flooding which may need to be updated based on a final flood plain determination. Long-term groundwater cumulative impacts from all sources are still under development.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INEEL, or decisions deferred in the ROD, will require additional analysis for this discipline.

8-1.6 Ecology

Scope of 1995 Analysis

The ecological resources of the INEEL (then INEL) are described in Section 4.9 of the Affected Environment Chapter of the 1995 EIS. Section 4.9 is divided into descriptions of INEEL flora, fauna, threatened, endangered and sensitive species, wetlands and radioecology. The impacts of implementing spent nuclear fuel management and environmental restoration and waste management alternatives on the ecology of the INEEL are analyzed in Section 5.9 of the Environmental Consequences chapter of the EIS.

Changes in the Environmental Discipline

1. Methodology

1995-Because existing major facility areas, such as RWMC, were expected to be most affected by the alternatives analyzed, the "biotic resources" in those areas were emphasized in the Sec. 4.9 description. Because some species are mobile, such as pronghorn, biotic resources for the entire INEEL were briefly described. The Sec. 5.9 analysis is qualitative, and focuses on potentially affected areas such as sites and facilities to be used, constructed, or remediated and surrounding habitat where effluents, emissions, light, or noise may be present.

2000-So far as planned DOE actions analyzed in the 1995 EIS are concerned, nothing has occurred which indicates the methodology used is inadequate or inaccurate. There have been no impacts or conditions resulting from actions analyzed in the EIS that exceeded the expected impacts. The methodology used is adequate and accurate. Unanticipated natural events, such as the wildland fires occurring on the INEEL since 1995, and DOE's response actions, such as grading fire breaks, potentially caused more extensive, more severe, and longer lasting impacts to the ecology of the INEEL than any action anticipated in the 1995 EIS.

2. Assumptions

1995-Assumptions were not stated but it was expected that locations analyzed in the EIS, such as landfill expansion, would take place adjacent to the existing landfill and that what became the AMWTP would be constructed on undisturbed land outside of existing major facilities.

2000-Impacts resulting from actions analyzed in the 1995 EIS, especially those related to land use and the clearing of undisturbed habitat, were overestimated by about 200 acres. For example, the AMWTP was constructed within the RWMC and there was no clearing of vegetation or related habitat loss.

3. Analytical Methods

1995-The method of analysis was based primarily on acres disturbed, 591 acres under the Ten Year Plan and 1,339 under the Maximum Treatment, Storage, and Disposal Alternative. Other impacts identified were those that would occur from vehicular traffic, the noise and emissions of generators, night-lights, artificial water sources, re-suspension of radionuclides and remediation of contaminated areas.

2000-As stated in number 2 above, the 1995 EIS overestimated the acreage that would be disturbed. Other than this, there have been no impacts resulting from planned DOE actions that were not accurately anticipated and analyzed in the 1995 EIS or subsequent NEPA documentation. Traffic, noise and emissions from generators, night-lights and artificial water sources, have not exceeded that analyzed in the EIS. The potential for re-suspension of radionuclides caused by wildfires since 1995 greatly exceeded that anticipated for planned DOE actions. The potential for re-suspension of radionuclides resulted from the exposure of large burned areas and newly graded firebreaks to high winds over a period of months. Samples of wind-blown dust from these areas, however, indicated no contaminants over background. DOE actions analyzed in the EIS and implemented by DOE have not contributed to the extent or intensity of wildfires.

4. Data Adequacy

1995-The data concerning the occurrence and distribution of flora and fauna, threatened, endangered and sensitive species and existence of wetlands was adequate. There was limited information on the deposition or accumulation of radionuclides and contaminants such as mercury in soils. Long-term monitoring data indicated no impacts to wildlife at the individual or population level.

2000-Sage Grouse populations have declined throughout Western U.S. and on the INEEL. There has also been extensive reduction of the sagebrush steppe vegetation type in Eastern Idaho and on the INEEL. Wolves designated as belonging to an experimental, non-essential population have been sighted on the INEEL. Though major changes have occurred as a result of fire and loss of Sage Grouse habitat, none of the change resulted from, or were affected by, the alternatives analyzed in the 1995 EIS. Because of these changes, the 1995 EIS is now inaccurate with regard to certain aspects of the data, but is not inadequate for identification of impacts within the scope of its analysis. Additional analysis is required to address the effects of wildland fire, fire fighting, and restoration to adequately describe the environment and analyze the potential effects of ground disturbing actions on INEEL ecology.

5. Accident Scenarios

No change. The impacts of accidents to the ecology of the INEEL and region were not analyzed in the 1995 EIS. It can be assumed, however, that a large, high consequence accident would create a larger "footprint." The largest footprint would be created by a low probability accident scenario analyzed in the HLW & FD EIS, an aircraft crash into the calcine bin sets at INTEC.

6. Accident Probabilities: No change.

7. Cumulative Impacts

1995-Cumulative impacts on Ecological Resources are analyzed in Section 5.15.6. This Section states that the types of cumulative impacts on ecological resources would be the same for all alternatives. That is, impacts would result primarily from land disturbance, which would cause lost productivity, reduced biodiversity, displacement from disturbed habitat, and habitat fragmentation.

2000-DOE planned actions and alternatives analyzed in the 1995 EIS that have been implemented have had little or no impact on aspects of the ecological environment considered

in the 1995 EIS. Neither have any of the actions analyzed in the EIS had incremental impacts of a cumulative nature which have contributed to loss of productivity, reduced biodiversity, or habitat fragmentation. The EIS did not anticipate or consider the effects of wildfire and fire suppression. Since 1995, wildfire and the effects of response actions on the INEEL, such as constructing fire breaks, has had a much greater effect on habitat and ecological potential than planned DOE actions. Fire is natural and habitat recovery from fire through transitional stages is normal where the environment has not been altered. The presence of invasive plant species presents a risk of permanent conversion of vegetation and habitat type from sagebrush steppe to cheatgrass. A wildland fire environmental assessment was initiated in January 2001 to address this issue.

8. Changes in Regulatory Requirements

There have been no changes in regulations pertaining to ecological resources that would affect the environmental baseline or analysis of impacts. There has been one land use designation within the INEEL, the 73,263-acre "INEEL Sagebrush Steppe Ecosystem Reserve." The objective is to maintain the Reserve as sagebrush steppe and there are no DOE actions, either planned or ongoing, which would affect the Reserve or its ecological condition. The U.S. Fish and Wildlife Service has determined that a population of the Western Sage Grouse merits listing as threatened under the Endangered Species Act, but the Agency does not have the resources to conduct a full listing action. See 66 FR 22984, May 7, 2001. There may be petitions for listing populations in Southeast Idaho. If Sage Grouse were listed, it would affect land management and use on the INEEL. It is not expected that ongoing operations within fenced facility boundaries would be affected.

9. Other NEPA Analyses for INEEL Operations

Except for the New Borrow Source EA and scattered categorically excluded activities, none of the NEPA documents completed since 1995 propose or analyze ground disturbing actions that would occur outside facility boundaries. Nor do these documents identify air emissions or resulting depositions exceeding those analyzed in the 1995 EIS. All CERCLA actions, except for the new percolation ponds to be constructed near INTEC, and scattered well drilling and monitoring and sampling activities, would occur within facility boundaries or within waste area groups or operable units.

Summary of Major Impacts

The actions and alternatives analyzed in the 1995 EIS that have been implemented have had little or no impact on ecological resources. Also, it is expected that those actions and alternatives analyzed in the EIS, that are yet to be implemented, would have minimal impact on site ecology. The impacts of fire, fire suppression, and threat of permanent habitat conversion caused by non-native invasive plant species are the main sources of ecological impacts on the INEEL. No additional analysis with regard to planned DOE actions is required. The Wildland Fire EA under preparation is required to understand impacts on the Sagebrush Steppe ecosystem on the INEEL of fire, pre-fire suppression, vegetation management, and restoration actions.

The analysis in the 1995 EIS was adequate for DOE decisions announced in the ROD. Future DOE decisions on major federal actions on the INEEL, or decisions deferred in the ROD, will require additional analysis for this discipline. The Wildland Fire EA being prepared will address

the outstanding ecological impacts. No analysis beyond that being performed by the Wildland Fire EA is required.

References:

1. FR (Federal Register), 2001, 66 FR 88, "50 CFR Part 17, Endangered and Threatened Wildlife and Plants; 12-Month Finding for a Petition To List the Washington Population of Western Sage Grouse (Centrocercus urophasianus phaios)", Department of the Interior, May 7, pg. 22984

2. Upper Snake Sage Grouse Local Working Group Working Charter

8-1.7 Environmental Justice

Scope of 1995 Analysis

Section 5.20 of Volume 2 Part A of the 1995 EIS assessed Environmental Justice as it relates to waste management and environmental restoration activities. The 1995 EIS used 1990 U. S. Bureau of Census data (USBC 1992). The census data was used to develop census tracts designed to encompass approximately 4,000 people per tract.

USBC classifications were used to define "minority". For purposes of the analysis in the 1995 EIS, minority populations were defined as those census tracts within the zone of impact for which the percent minority population exceeds the average of all census tracts within the zone of impact or where the percent minority population exceeds 50 percent for any given census tract. Low-income populations were defined as a group of people and/or community experiencing common conditions of exposure or impact, in which 25 percent or more of the population is characterized as living in poverty. The 1990 USBC definition of poverty was used.

The primary assumption used in the 1995 EIS was to designate Argonne National Laboratory-West as the epicenter for the region of impact. The zone of impact was an 80-kilometer radius circle with its epicenter at Argonne National Laboratory-West. Because of the diversity of locations of current and proposed activities, that epicenter was used to conservatively identify the maximum number of minority and low-income populations.

Changes in the Environmental Discipline

1. Methodology-No change

2. Assumptions-No change

3. Analytical Methods-NA

4. Data Adequacy- The USBC data used is still valid until the new census information becomes available.

5. Accident Scenarios-N/A

6. Accident Probabilities-N/A

7. Cumulative Impacts-N/A

8. Changes in Regulatory Requirements-Executive Order 13045 "Protection of Children from Environmental Health Risks and Safety Risks" was signed on April 21, 1997. No guidance or regulations have been created to implement that Order.

9. Other NEPA Analysis for INEEL Operations- Additional NEPA analyses for Environmental Justice concerns have been completed in the Advanced Mixed Waste Treatment Project EIS; Treatment and Management of Sodium-Bonded Spent Nuclear Fuel EIS; the Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production

Missions in the United States, including the Role of the Fast Flux Test Facility; and the High-Level Waste and Facilities Disposition EIS.

A qualitative analysis was performed to determine if there were any changes in the environmental justice discipline. The analysis included a review of the current INEEL activities and compared those to activities analyzed in the 1995 EIS. The methodology used in the 1995 EIS analysis is consistent with the Council on Environmental Quality guidance issued in 1997. That guidance is still in effect and DOE-HQ has not issued any final guidance changing those requirements or imposing additional requirements. The major assumption of having Argonne National Laboratory-West as the epicenter for the region of impact is reasonable and still valid for a site-wide analysis. The conditions, data, and methodology used in the1995 EIS are still valid and consistent with the requirements to evaluate and mitigate, if necessary, disproportionate high and adverse impacts to minority and low-income populations. The Census Bureau schedule indicates that the Demographic profile for Census Tracts (which includes demographic, social, economic, and housing characteristics) will be available sometime between March and May 2002. During the next Supplement Analysis of the 1995 EIS, the new data should be examined to determine if conditions have changed.

Summary of Major Impacts

A qualitative analysis was performed to determine if there were any changes in the environmental justice discipline. The analysis reviewed the current INEEL activities and compared those to activities analyzed in the 1995 EIS. The methodology used in the 1995 EIS analysis is consistent with the Council on Environmental Quality guidance issued in 1997. That guidance is still in effect and DOE-HQ has not issued any final guidance that has changed requirements or imposes additional requirements. The major assumption of having Argonne National Laboratory-West as the epicenter for the region of impact is reasonable and still valid for a site-wide analysis. The conditions, data, and methodology used for analysis in the 1995 EIS are still valid and consistent with the requirements to evaluate and mitigate, if necessary, disproportional high and adverse impacts to minority and low-income populations.

The analysis in the 1995 EIS provides a bounding analysis for the environmental impacts in this discipline. Additional analysis for this discipline is not required.

References:

1. Council on Environmental Quality, Environmental Justice Guidance Under the National Environmental Policy Act, December 10, 1997.

2. USBC (US Bureau of Census) 1990 Census of Population and Housing, 1/1/1992

8-1.8 Facility Accidents

Scope of 1995 Analysis

The Facility Accident analysis that was presented in the 1995 EIS analyzed a series of events from various INEEL facilities for a number of different initiating events considering internal initiators, external initiators, and natural phenomena. These initiating events were categorized in three frequency categories, abnormal (greater than 10^{-3} events per year), design basis (10^{-3} – 10^{-6}), and beyond design basis (10^{-6} – 10^{-7}). A summary of the historical record of accidents at the INEEL was provided as well as comparisons in accident fatality rates between various industries, the DOE complex, and the INEEL. The accidents were screened to pick the bounding accidents in each of the three frequency categories. The bounding accidents for the INEEL with respect to impacts to the public were located at ANL-W for both radiological and hazardous chemical accidents. Bounding accidents are those that are associated with the highest consequence without regard to probability. The primary sections in the 1995 EIS that addressed potential facility accidents are section 5.14 and Appendix F-5.

Changes in the Environmental Discipline

1. Methodology

In the past five years, a number of nuclear safety analysis reports have been upgraded to meet current requirements. While additional analysis has been performed on virtually every nuclear facility at the INEEL, the additional analysis has not identified greater impacts for bounding accidents for a specific waste type or facility. The exception to that statement is for HLW facilities. The HLW & FD EIS analyzes a completely different set of operations alternatives resulting in postulated accidents not previously considered. This new analysis has resulted in new bounding accidents for the INEEL from the new proposed HLW operations.

The bounding accidents for the INEEL in the 1995 EIS were at ANL-W for both radiological and hazardous impacts (due primarily to the proximity of the ANL-W site to the INEEL site boundary.) Both the spent fuel and the source of chlorine at ANL-W have been reconfigured in the past five years to greatly reduce the hazard associated with these activities.

2. Assumptions

The assumptions that were used in the1995 EIS were conservative for the various parameters. Each safety analysis document uses slightly different assumptions for the analysis based on the specific accidents being analyzed. For a generic set of assumptions that are applicable to all potential facility accidents on the INEEL, the ones that are identified in the1995 EIS are still acceptable.

3. Analytical methods

The primary computer codes used in the1995 EIS for the accident analysis were Radiological Safety Analysis Computer Program (RSAC-5), Origen 2.1, Microshield 3.13, and EPIcode™. These are still respected codes in the accident analysis community. Though upgrades in some of the codes have taken place, a number of the safety analysis documents across the site still use some of these codes to determine impacts to receptors. Performing additional accident analysis simply to update the codes probably would not provide significantly different results.

4. Data Adequacy

The primary concerns with data adequacy are in the areas of source term and meteorological data. The facility accident analysis that was completed with the1995 EIS used bounding source terms for specific facilities. No facilities on the site are known to have modified their safety basis documents to allow for greater source terms than what was previously analyzed. The meteorological data is used to determine what the 50% and 95% meteorological conditions are that are used to transmit the dose from a release site to a receptor. The meteorological data is based on long-term weather patterns in southeast Idaho and is not likely to have been significantly affected by the weather in the previous five years.

5. Accident Scenarios

Table 8-1.8.1 below shows a summary of the bounding potential facility accidents that were taken from the primary safety analysis documents for INEEL facilities and from other NEPA analysis that has been completed. The primary change is that the HLW & FD EIS provides the bounding accident for the site from a radiological and hazardous impacts perspective. In the 1995 EIS, the bounding accidents were at the ANL-W facility. The primary reasons for this change are the new decisions to be made regarding the HLW program and the source term at ANL-W has been treated in the last five years to significantly reduce potential accident impacts.

The 1995 EIS showed bounding accident impacts from a Hot Fuel Examination Facility fuel handling accident of 5.0 rem to the maximally exposed offsite individual (MEI) and an ANL-W chlorine release with a MEI exposure of 35% of the Emergency Response Planning Guidelines (ERPG)-3 guidelines. This compares to the HLW & FD EIS bounding accidents of a seismically induced failure of degraded bin sets up to 9500 years into the future resulting in 83 rem to the MEI and a spill of 15,000 pounds per minute of liquid ammonia which would result in greater than ERPG-2 concentrations at 3600 meters. These new impacts (HLW & FD EIS) now present the bounding impacts for INEEL operations.

6. Accident Probabilities

Accident probabilities have changed in some cases for specific accident scenarios. The bounding accidents for the INEEL with maximum impacts to the public are still in the beyond design basis range ($10^{-6} – 10^{-7}$). Moving spent fuel from wet storage to dry storage eliminates the probability of contaminated water from a spent fuel pool leaking into the ground and contaminating the ground water. In this case, the probability of that accident is eliminated when the pools are emptied of SNF and drained. Also, the probability of a criticality accident is reduced in a dry environment.

7. Cumulative Impacts

The only place, where cumulative impacts are considered with respect to safety analysis, is where an accident at one facility could have adverse impacts on a second facility. The effects of accidents on co-located facilities are required to be analyzed in safety analysis documents and are reflected as a part of the bounding accident analysis. As a result, there are no cumulative impacts from accident analysis such as there are in the area of air resources or water resources. The possibility of two accidents happening at the same time from different causes is so small that they are not analyzed (accidents that have less than a possibility of 1 event in 10,000,000 years (1×10^{-7}) are not analyzed).

8. Changes in Regulatory

The primary change in the regulatory area is the incorporation of 10 CFR 830 Subpart B (Nuclear Safety Rule). This codifies the nuclear safety rules providing Price Anderson Amendment enforcement actions for noncompliance with nuclear safety requirements. The other major change is the development of the Authorization Agreements. The Authorization Agreements are between the DOE and the operating contractor. These documents identify all safety bases and regulatory requirements in a single document for each individual nuclear category 1 and category 2 facility. These provide the authorization to operate specific facilities and provide the boundaries of all operational parameters under which operations are authorized.

9. Other NEPA Analysis for INEEL Operations

Additional NEPA analysis for potential facility accident concerns have been completed in the Advanced Mixed Waste Treatment Project EIS; Treatment and Management of Sodium-Bonded Spend Nuclear Fuel EIS; the Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States including the Role of the Fast Flux Test Facility; and the High-Level Waste and Facilities Disposition EIS.

Summary of Major Impacts

The existing analysis is technically adequate. However, each of the five major NEPA analyses of this discipline used slightly different input assumptions, models, and codes and as a result arrives at what could appear to be contradictory results. It is difficult to be able to compare impacts across the site because the analysis results are reported in different formats, different receptor locations, and different units. Standardized facility accident analyses utilizing a common set of assumptions, input parameters, codes, and formats would greatly assist the public and DOE management to compare the bounding impacts for facility accidents across the entire site. The existing analysis has not been shown to be inadequate but the results are reported in ways that are inconsistent.

The 1995 EIS showed bounding accident impacts from a Hot Fuel Examination Facility fuel handling accident of 5.0 rem to the maximally exposed offsite individual (MEI) and an ANL-W chlorine release with a MEI exposure of 35% of the Emergency Response Planning Guidelines (ERPG)-3 guidelines. This compares to the HLW & FD EIS bounding accidents of a seismically induced failure of degraded bin sets up to 9500 years into the future resulting in 83 rem to the MEI and a spill of 15,000 pounds per minute of liquid ammonia which would result in greater than ERPG-2 concentrations at 3600 meters. These new impacts (HLW & FD EIS) now present the bounding impacts for INEEL operations. These changes do not warrant additional accident analysis.

The environmental impacts described in the 1995 EIS are not bounding for the INEEL, but the bounding impacts are described in the HLW & FD EIS. Additional analysis for this discipline is not required.

References:

1. Idaho High Level Waste and Facilities Disposition Draft Environmental Impact Statement DOE/EIS-0287D, December 1999

2. Advanced Mixed Waste Treatment Project EIS DOE/EIS-0290, January 1999

3. Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States including the Role of the Fast Flux Test Facility DOE/EIS-310, December 2000

4. Test Area North Safety Analysis Report – INEL-94/0163 Addendum 1, Rev. ID:2 June 2000

5. Advanced Test Reactor Upgraded Final Safety Analysis Report INEEL, SAR-153 Rev. 5, July 1, 1999

Table 8-1.8.1 Summary of Facility Accidents at the INEEL That Have the Potential for Off-Site Radiological Consequences

This table does not represent all of the events that have been analyzed but does represent the bounding events for INEEL operations. Blocks that are blank represent areas where information was not available. In many cases, additional analysis results were presented in the source documents but are not shown here. For the purposes of being able to compare analysis results, the following information is provided. Different terms are used in the source documents for the same receptor locations and in a number of cases the input assumptions may cause the results to not be comparable to other analyses. This is provided to allow the reader to have a basic understanding of the primary bounding accidents across the INEEL.

Accident	Frequency	TEDE at 100 m (rem)	Maximally Exposed Offsite Individual		Population to 50 miles		Noninvolved Worker		Meets Evaluation Guidelines
			Dose (rem)	Latent Cancer Fatality Probability	Dose (person-rem)	Latent Cancer Fatalities	Dose (rem)	Latent Cancer Fatality Probability	
Environmental Restoration									
No accidents were identified that would result in offsite consequences									
High Level Waste (bounding accidents from the HLW & FD EIS)[a]									
Seismic failure of a degraded bin set	Unlikely	Note 1	83	0.042	5.3×10^{5}	270	5.7×10^{6}	1.0	Yes
Calcine retrieval onsite transport equipment failure	Unlikely	Note 1	0.04	2.0×10^{-5}	470	0.23	2.7×10^{3}	1.4×10^{-3}	Yes
Flood induced failure of a bin set	Extremely Unlikely	Note 1	0.88	4.4×10^{-4}	5.7×10^{4}	29	59	0.059	Yes
External event results in a bin set release	Beyond Design Basis	Note 1	14	7.0×10^{-3}	1.2×10^{5}	61	930	0.94	Yes
External event results in a release from the borosilicate vitrification facility	Beyond Design Basis	Note 1	17	8.5×10^{-3}	1.5×10^{5}	76	1.2×10^{3}	1.0	Yes
Infrastructure									
ANL-W, ZPPR, Materials Storage Building, uranium burning event			0.4				1.0		Yes

Accident	Frequency	TEDE at 100 m (rem)	Maximally Exposed Offsite Individual		Population to 50 miles		Noninvolved Worker		Meets Evaluation Guidelines
			Dose (rem)	Latent Cancer Fatality Probability	Dose (person-rem)	Latent Cancer Fatalities	Dose (rem)	Latent Cancer Fatality Probability	
Spent Nuclear Fuel									
Earthquake[d]	1.0×10^{-3}		(g)						Yes
Inadvertent Criticality – TAN[d]	Extremely Unlikely	47	0.78						Yes
TMI-2 6-pack Module Drop[d]	9.1×10^{-3}	0.016 rad/hr at 75 meters	insigni-ficant		insigni-ficant		0.016 rad/hr at 75 meters		Yes
Exposure to high radiation fields[d]	7.6×10^{-7}		(g)						Yes
Mixed Waste Fire[d]	1.8×10^{-7}		(g)						Yes
Release of gaseous fission products[d]	5.6×10^{-3}		(g)						Yes
Underground Fuel Storage Facility – Fuel drop into dry well		1.6×10^{-4}	1.4×10^{-6}						Yes
Florinel Dissolution & Fuel Storage Facility - criticality		13.1							Yes
Irradiated Fuel Storage Facility – criticality		0.4	9.0×10^{-4}						Yes
Unirradiated Fuel Storage Facility – criticality		160	1.4×10^{-3}						Yes
Test Reactor Area									
ATR Direct Damage Loss of Coolant Accident with 100% core melt[b]	Beyond Design Basis		0.60	3.0×10^{-4}	5.17×10^{4}	25.9	7.61	3.0×10^{-3}	Yes
ATR Direct Damage Loss of Coolant Accident with 100% core melt[e]	Beyond Design Basis		11[f]						Yes
Waste Management									
Fire in TRU waste in the TSA-RE[c]	Unlikely	2.1×10^{-2}	3.5			0.005			Yes
Incinerator Explosion	Unlikely	1.4×10^{-3}	0.24			1.8			Yes
Design Basis Seismic Event[c]	Unlikely	2.6	4.8×10^{-2}			0.98			Yes

Accident	Frequency	TEDE at 100 m (rem)	Maximally Exposed Offsite Individual		Population to 50 miles		Noninvolved Worker		Meets Evaluation Guidelines
			Dose (rem)	Latent Cancer Fatality Probability	Dose (person-rem)	Latent Cancer Fatalities	Dose (rem)	Latent Cancer Fatality Probability	
Type II module fire[c]	Extremely Unlikely	1.3×10^{-2}	2.2			0.05			Yes
Propane-fueled fires[c]	Extremely Unlikely	2.6	2.2			1.14			Yes

Note 1 - This information was not provided in the source document

A Idaho High Level Waste and Facilities Disposition Draft Environmental Impact Statement (HLW & FD EIS) – The accidents shown in this table are a representative sample of the accidents in this document. The accidents selected for inclusion here are the bounding accidents from the HLW & FD EIS Table 5.2-39.

B Final Programmatic Environmental Impact Statement for Accomplishing Expanded Civilian Nuclear Energy Research and Development and Isotope Production Missions in the United States including the Role of the Fast Flux Test Facility

C Advanced Mixed Waste Treatment Project EIS

D Test Area North Safety Analysis Report – INEL-94/0163 Addendum 1, Rev. ID:2 June 2000

E Advanced Test Reactor Upgraded Final Safety Analysis Report

F The dose from the ATR SAR and the NI PEIS are significantly different for the same accident. The difference is a result of a number of differences in the models used. The primary difference is that the ATR SAR modeled the accident using 95% meteorology and the NIPEIS used 50% meteorology.

G DOE Evaluation Guidelines are not exceeded for this accident

The following terms are used in some analyses to describe frequency of postulated events

Anticipated	1.0×10^{0} - 1.0×10^{-2} years
Unlikely	1.0×10^{-2} - 1.0×10^{-4} years
Extremely Unlikely	1.0×10^{-4} - 1.0×10^{-6} years
Beyond Design Basis	$<1.0 \times 10^{-6}$ years

Table 8-1.8.2 Summary of Facility Accidents at the INEEL That Have the Potential for Off-Site Chemical Consequences

This table does not represent all of the events that have been analyzed but does represent the bounding events for INEEL operations. Blocks that are blank represent areas where information was not available. In many cases, additional analysis results were presented in the source documents but are not shown here. For the purposes of being able to compare analysis results, the following information is provided. Different terms are used in the source documents for the same receptor locations and in a number of cases the input assumptions may cause the results to not be comparable to other analyses. This is provided to allow the reader to have a basic understanding of the primary bounding accidents across the INEEL.

Accident	Frequency	Ammonia	Sulfuric Acid				Meets Evaluation Guidelines
Environmental Restoration							
No accidents were identified that would result in offsite consequences							
High Level Waste (bounding accidents from the HLW & FD EIS)[a]							
Ammonia tank spill of 150 pounds per minute of liquid ammonia	Unlikely	Less than ERPG-2 at 3,600 meters					Yes
Ammonia tank spill of 1500 pounds per minute of liquid ammonia	Extremely Unlikely	Greater than ERPG-2 at 3,600 meters					Yes
Ammonia tank spill of 15,000 pounds per minute of liquid ammonia	Beyond Design Basis	Greater than ERPG-2 at 3,600 meters					Yes
Infrastructure							
ANL-W, EBR-II, Power Plant Building, sulfuric acid leak from a 2,000 gal Storage tank			ERPG-1 at 218 m	ERPG-2 at 65 m	ERPG-3 at tank		Yes

Accident	Frequency	Asbestos ERPG-2 (2.5E-02)	Beryllium ERPG-2 (2.5E-02)	Cadmium ERPG-2 (4.0E+00)	Lead ERPG-2 (2.5E-01)	Mercury ERPG-2 (1.00E-01)	Meets Evaluation Guidelines
Spent Nuclear Fuel							
No accidents were identified that would result in offsite consequences							
Test Reactor Area							
No accidents were identified that would result in offsite consequences							
Waste Management (AMWTP/RWMC)							
Fire in TRU waste in the TSA-RE[b]	Unlikely	1.3×10^{-2}	9.0×10^{-5}	8.9×10^{-6}	7.9×10^{-5}	2.6×10^{-6}	Yes
Incinerator Explosion[b]	Unlikely	0	0	8.9×10^{-6}	7.9×10^{-5}	2.6×10^{-6}	Yes
Design Basis Seismic Event[b]	Unlikely	3.5×10^{-4}	5.5×10^{-6}	9.6×10^{-5}	5.9×10^{-4}	3.3×10^{-6}	Yes
Type II module fire[b]	Extremely Unlikely	2.5×10^{-2}	7.4×10^{-5}	1.2×10^{-4}	3.3×10^{-3}	4.2×10^{-6}	Yes
Propane-fueled fires[b]	Extremely Unlikely	2.5×10^{-2}	7.4×10^{-5}	1.2×10^{-4}	3.3×10^{-3}	2.6×10^{-5}	Yes

A Idaho High Level Waste and Facilities Disposition Draft Environmental Impact Statement (HLW & FD EIS) – The accidents shown in this table are a representative sample of the accidents in this document. The accidents selected for inclusion here are the bounding accidents from the HLW & FD EIS.

B Advanced Mixed Waste Treatment Project EIS